

LIGHT-BLOCKING AIR VENTS FOR EYEWEAR**Field of the Invention:**

The invention relates to the field of eyewear and, more particularly, to eyewear
5 having air vents.

Background of the Invention:

Eyewear is often designed to fit closely to the wearer's face so as to block light, wind, water or dust from entering the area behind the lens or lenses. This also tends to
10 trap moisture, which can result in fogging of the lens or lenses. The tendency for fogging can be reduced by the provision of vents which allow moist air to escape the area behind the lens or lenses.

A number of venting techniques have been employed for eyewear. For example, U.S. Patent No. 6,233,342 discloses eyewear for use in sports and the like which allows
15 the user to adjust the flow of air across the inside surface of the lens without having to remove the eyewear. Ventilation apertures are preferred to be covered with permeable foam to prevent the ingress of dust and particulate matter through the apertures. A sliding block provides control over airflow. This eyewear has a drawback in that moving parts are required to control airflow and the foam for covering the ventilation apertures
20 contribute to increased complexity of the eyewear and, thus, cost of manufacture.

U.S. Patent No. 5,969,787 discloses eyewear with browbar ventilation and detachable temples. A browbar frame is detachably secured to a lens and temples are detachably secured to the browbar frame. The browbar frame includes numerous openings to allow air to pass through the browbar frame for preventing fogging of the
25 lens. This eyewear has a disadvantage that light is not inhibited from entering behind the lens area through the ventilation openings.

U.S. Patent No. 5,760,868 discloses eyewear having a ventilated frame including air inlets on lateral sides of the frame. This eyewear also has a disadvantage in that light is not inhibited from entering behind the lens area through the air inlets.

Therefore, what is needed is an improved technique for eyewear ventilation which is not excessively complex to manufacture and that inhibits light from entering behind the lens area of the eyewear or into the wearer's eye.

5 Summary of the Invention:

The invention provides light-blocking air vents for eyewear. In one embodiment, a frame for the eyewear has a brow web that extends approximately horizontally from a top portion of the frame. The brow web includes at least one ventilation aperture having an internal side that is substantially sloped with respect to a top surface of the brow web.

10 One or more lenses are mounted to the frame. Air is allowed to pass through the aperture. However, by providing that the internal side of the aperture is substantially sloped, light is blocked from entering through the aperture. A lower web may also be provided that may include one or more ventilation apertures so as to provide cross-ventilation for the lenses. Side lenses may also be provided to increase the wearer's 15 peripheral vision. Ventilation apertures may be provided for ventilating the side lenses.

In another embodiment, the brow web includes a plurality of ventilation apertures for each of two lenses mounted to the frame. The apertures for each lens are arranged substantially equally-spaced in a row and wherein each aperture has parallel sides and a center axis that is substantially sloped with respect to a top surface of the brow web. The 20 brow web and frame may be molded as a single body.

In yet another embodiment, a frame for the eyewear includes at least one ventilation aperture having an internal side that is substantially perpendicular to a wearer's line of sight toward the ventilation aperture. Thus, the ventilation apertures can be positioned at various locations on the frame, including the brow bar. However, by 25 sloping the sides of the apertures with respect to the wearer's line of sight, light is blocked from entering the wearer's eye.

These and other aspects of the invention as described in more detail herein.

Brief Description of the Drawings:

30 Figure 1 illustrates a front perspective view of eyewear in accordance with an embodiment of the present invention;

Figure 2 illustrates a top view of eyewear in accordance with an embodiment of the present invention;

Figure 3 illustrates a side-sectional view of eyewear in accordance with an embodiment of the present invention;

5 Figure 4 illustrates a bottom view of eyewear in accordance with an embodiment of the present invention;

Figure 5 illustrates a side-sectional view of eyewear in accordance with an embodiment of the present invention; and

10 Figure 6 illustrates a rear perspective view of eyewear in accordance with an embodiment of the present invention.

Detailed Description of a Preferred Embodiment:

Referring to Figure 1, a perspective view of eyewear 100 is shown in accordance with an embodiment of the present invention. Figure 2 illustrates a top view of the 15 eyewear 100. The eyewear 100 includes a frame 102, lenses 104 and earpieces 106. In a preferred embodiment, two lenses 104 are provided, though it will be apparent that the two lenses can be replaced with a single lens. Also, one more additional lenses (e.g., side lenses) may be provided.

The frame 102 preferably includes a brow web 108 that extends from a top 20 portion of the frame 102. The top surface of the brow web 108 is substantially horizontal while the eyewear 100 is being worn. The brow web 108 inhibits light from entering the area behind the lenses 104 and into wearer's eyes by occupying a gap that would otherwise be present between the top portion of the frame 102 and the wearer's face. Thus, to block a maximum amount of light, the brow web 108 preferably has a curved 25 edge that substantially conforms to the brow area or forehead of the wearer's face.

The front lenses 104 are preferably tinted. In addition, side lenses 110 may also be provided in the frame 102 which are also tinted so as to provide increased peripheral vision while shielding the wearer's eyes from light which might otherwise enter at the sides of the frame 102. The eyewear 100 be worn by itself, without any other eyewear, or 30 may be worn with other eyewear. For example, the eyewear 100 may be worn over conventional eyeglasses having vision-corrective lenses.

The frame 102 includes at least one ventilation aperture 112, though a plurality of ventilation apertures 112 is preferably provided. In a preferred embodiment, the ventilation apertures 112 are provided in the brow web 108 so as to allow moist air, which might otherwise be trapped by the brow web 108, to exit from behind the lenses.

5 In addition, a plurality of apertures 112 may be provided for each of the two lenses 104, where the apertures 112 for each lens 104 are arranged substantially equally-spaced in a row that approximately follows the curvature of the lens 104. A preferred number is three apertures above each lens 104 for a total of six apertures 112 in the brow web 108. This is shown in Figures 1 and 2.

10 As is also shown in Figures 1 and 2, the apertures 112 may be substantially oval, though in other embodiments, the apertures may be substantially round, polygonal or of another shape.

15 Figure 3 illustrates a side-sectional view of the frame 102 for the eyewear 100 in accordance with an embodiment of the present invention. The section of Figure 3 is taken through the broken line shown in Figure 2. As shown in Figure 3, the apertures 112 have at least one internal side that is substantially sloped with respect to a top surface 114 of the brow web 108. More particularly, line 116 in Figure 3 is parallel to the top surface 114 of the brow web 108, while line 118 is parallel to a rear-most side of the aperture 112. The lines 116 and 118 are separated by a substantial angle A, with the line 20 118 being sloped upward in the direction of the wearer and with the inside opening of the aperture 112 being pointed toward the lens 104. In a preferred embodiment, the angle A is approximately forty-five degrees though the angle A may be greater or less than forty-five degrees.

25 The internal side of the aperture 112 is preferably substantially perpendicular to a line of sight 120 of the wearer when the wearer is looking toward the ventilation apertures 112. This is shown by the wearer's eye 122 being angled upward in Figure 3. Thus, the line 118 is substantially perpendicular to the line of sight 120 so that the angle B is approximately ninety degrees, though the angle A can be greater or less than ninety degrees. In other words, the internal side of the aperture 112 is substantially parallel to 30 the circumference of the user's eye. By providing that the internal side of the aperture is substantially sloped, light 124 is blocked from entering the wearer's eye through the

aperture 112. It is expected that light having a source behind the wearer will be substantially blocked from passing through that the apertures 112 by the wearer (i.e. the apertures 112 will be in the wearer's shadow).

In a preferred embodiment, the apertures 112 have parallel sides, as shown in Figure 3, though the apertures 112 may have tapered sides (e.g., forming a conical shape). In addition, limiting the width of the apertures 112 to be substantially equal to or less than the thickness of the material through which each extends (e.g., the brow web 108), also inhibits light 124 from entering the wearer's eye 122. Otherwise, if an aperture 112 is too wide with respect to the thickness of the brow web 108, light may enter despite the sloping side of the apertures 112. Thus, where the width of the apertures 112 is approximately equal to the material thickness, an approximately forty-five degree angle, as discussed above, is preferred. However, where the material is thicker, a greater angle can be used and, where the material is thinner, a smaller angle may be necessary.

To maximize removal of moist air, the apertures 112 are preferably positioned as close to the lens 104 as is practical. However, the lenses 104 may be mounted in channel 126 formed in the frame 102. More particularly, the channel 126 is formed of a ring of material on either side of the lens 104 periphery. Accordingly, the apertures 112 are preferably positioned closely adjacent to the channel 126, but without invading the channel 126, so as to avoid compromising its structural strength.

Figure 4 shows a bottom view of eyewear in accordance with an embodiment of the present invention. As shown in Figure 4, the frame 102 may optionally include lower webs 128. The lower webs 128 are positioned beneath each of the front lenses 104 and inhibit light from entering the area behind the lenses 104 and into wearer's eyes by occupying a gap that would otherwise be present between the lower portion of the frame 102 and the wearer's face. Thus, to block a maximum amount of light, the lower webs 128 preferably each have a curved edge that substantially conforms to the area of the wearer's face beneath the eyes.

Thus, in another embodiment, one more ventilation apertures 112 may be provided in locations other than, or in addition to, those the brow web 108. For example, one or more ventilation apertures 112 may be provided in the lower webs 128. As shown in Figure 4, in a preferred embodiment, two ventilation apertures 112 arranged

substantially in a row are provided in the lower web 128 beneath each of the front lenses. These apertures 112 allow moist air, which might otherwise be trapped to exit from behind the lenses. Taken in combination with the apertures in the brow web 108 (Figures 1 and 2), these apertures 112 provide for cross-ventilation of the lenses 104 for improved 5 reduction of lens fogging. More particularly, air is allowed to flow into the space behind the front lenses 104 (e.g., through the apertures 112 in the lower web 128), across the lenses 104 and out of the space behind the lenses 104 (e.g., through the apertures 112 in the brow web 108).

Figure 5 shows a side-sectional view of eyewear in accordance with an 10 embodiment of the present invention having ventilation apertures 112 in the lower web 128. The section of Figure 5 is taken through the broken line shown in Figure 2. As shown in Figure 5, the apertures 112 in the lower web 128 preferably have at least one internal side that is substantially sloped with respect to a bottom surface 130 of the lower web 128. In a preferred embodiment, the angle is approximately forty-five degrees, 15 though the angle may be greater or less than forty-five degrees. For the apertures 112 beneath the lenses 104, the slope is preferably in the opposite direction than the apertures 112 above the lenses 104. Thus, the internal side of the aperture 112 is sloped downward in the direction of the wearer and with the inside opening of the aperture 112 being pointed toward the lens 104. Also, the internal side of the aperture 112 is preferably 20 substantially perpendicular to a line of sight 120 of the wearer when the wearer is looking toward the ventilation apertures 112. This is shown by the wearer's eye 122 being angled downward in Figure 5.

Figure 6 illustrates a rear perspective view of eyewear in accordance with an 25 embodiment of the present invention including ventilation apertures in proximity to the sides lenses 110. As shown in Figure 6, ventilation apertures 112 are provided for each of the side lenses 110, include one aperture 112 above each of the two side lenses 110 and one aperture beneath each of the side lenses 110. Preferably, these apertures 112 also have an internal side that is sloped, such that light entering the aperture 112 is directed away from the wearer's eye. Thus, the sides and internal opening of these apertures 112 30 are preferably pointed toward the side lens 110. By providing one or more apertures above and below each side lens 110, cross-ventilation of air may be allowed for each of

the side lenses 110. In another embodiment, the present invention includes a method of manufacture of eyewear 100 having ventilation apertures 112. Preferably, the brow web 108 and frame 102 are molded as a single body (e.g., of plastic, nylon, metal, etc.) with the earpieces 106 being movably attached to the frame 102 by hinges. Thus, the method 5 includes molding the frame 102 and, preferably the brow web 108, as a single body. A mold used in the manufacture preferably includes a number of bosses in the shape of the ventilation apertures 112 so that the ventilation apertures 112 are formed at the same time as the frame 102. The one or more lenses 104 and the earpieces 106 may then be attached to the molded frame 102.

10 While the foregoing has been with reference to particular embodiments of the invention, it will be appreciated by those skilled in the art that changes in these embodiments may be made without departing from the principles and spirit of the invention, the scope of which is defined by the appended claims.